

C. REMARKS:

Claims 1-21 have been cancelled without prejudice, and Claims 22-53 have been added. The fact that Claims 1-21 have been cancelled without prejudice is not to be construed as an admission by Applicant or Applicant's attorney that such claims are unpatentable, and Applicant reserves the right to prosecute such claims in a continuing application.

Claims 1-18 and 20 stood rejected under 35 U.S.C. 103 as being unpatentable over Jung, et al. in view of Heckelsberg, and further in view of Kukes, et al. This rejection is respectfully traversed.

The present invention is directed to a process for converting butene-1 to ethylene and hexene-1. The process comprises subjecting, in step (a), a feed including the butene-1 to catalytic metathesis under conditions and with a metathesis catalyst that produces an effluent comprising ethylene and hexene-3, to provide a weight selectivity to hexene-3 of at least 40% from butene-1. This improved selectivity to hexene-3 is achieved via recycle to the produced pentenes into the reaction system of the butene-1 metathesis, and by avoiding the isomerization of butene-1 to butene-2.

The effluent in step (b) then is fractionated into a first stream containing the hexene-3, and a second stream including unreacted butene-1 and an internal pentene olefin.

In step (c), the first stream, including the hexene-3 is subjected to isomerization to convert the hexene-3 to hexene-1.

In step (d), the second stream of step (b) is subjected to metathesis by recycling the stream to metathesis in step (a).

In step (e), the combined effluent from the metathesis of said second stream and the metathesis of fresh feed in step (a) are subjected to fractionation in step (b).

Jung disproportionates butene-1 into ethylene, pentenes, and 3-hexene. Jung, however, does not disclose or even remotely suggest to one of ordinary skill in the art that the internal olefin 3-hexene is isomerized to the linear alpha olefin hexene-1.

Kukes is directed solely to supported tungsten oxide or supported molybdenum oxide metathesis catalysts. The catalyst may be used to convert a 1-pentene/2-pentene mixture to a mixture of 1-butene and 2-hexene or a mixture of 2-butene and 3-hexene. Kukes does not disclose or even remotely suggest to one of ordinary skill in the art that

the internal olefins, 2-hexene or 3-hexene, can be isomerized to the linear alpha olefin 1-hexene.

In addition, Kukes is relied upon by the Examiner to show metathesis in the presence of a catalyst. Kukes, however, does not disclose or even remotely suggest to one of ordinary skill in the art that the metathesis is carried out in the presence of a catalyst and under conditions that provide a weight selectivity to hexene-3 of at least 40% from butene-1. Furthermore, Kukes does not show that the metathesis of 2-pentene occurs via recycle to the metathesis reactor and occurs simultaneously with the metathesis of butene-1 to suppress the reactions of butene-1 and butene-2 to form propylene and 2-pentene, thus increasing the selectivity of the butene-1 reaction to form ethylene and hexene-3.

The only reference which discloses the isomerization of 3-hexene to 1-hexene is Heckelsberg. Heckelsberg, however, does not even remotely suggest Applicant's claimed process to one of ordinary skill in the art. In Heckelsberg, propylene is metathesized into ethylene and butene-1. The butene-1 then is metathesized into ethylene and hexene-3. The hexene-3 is isomerized into hexene-1. The hexene-1 is metathesized into ethylene and decene-5.

In Heckelsberg, it is assumed that the reactions proceed with inherently 100% selectivity. In Heckelsberg, no pentene is produced during the conversion process of the reaction between butene-1 and itself. Therefore, Heckelsberg does not disclose or even remotely suggest to one of ordinary skill in the art step (b) of the claimed process in which the effluent from step (a) is fractionated into a first stream including hexene-3 and a second stream including unreacted butene-1 and an internal pentene olefin. Therefore, because Heckelsberg does not disclose or even remotely suggest to one of ordinary skill in the art step (b) of Applicant's claimed process, Heckelsberg does not render Applicant's claimed process obvious to one of ordinary skill in the art.

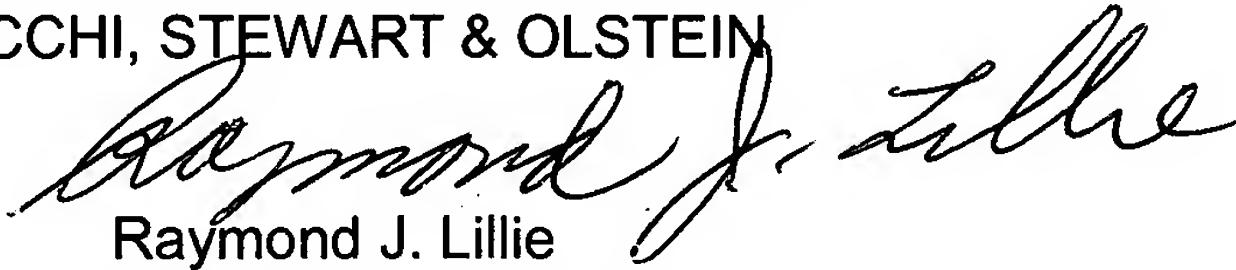
The cited references, taken in combination, do not disclose or even remotely suggest to one of ordinary skill in the art Applicant's claimed process. Therefore, the cited references do not render Applicant's claimed process obvious to one of ordinary skill in the art, and it is therefore respectfully requested that the rejection under 35 U.S.C. 103 be reconsidered and withdrawn.

With respect to the rejection under 35 U.S.C. 112, second paragraph, Claims 1-21 have been cancelled without prejudice and such rejection hereby is rendered moot. The cancellation of Claims 1-21, however, is not to be construed as an admission by Applicant or Applicant's attorney that such claims are unpatentable under 35 U.S.C. 112, second paragraph.

For the above reasons and others, this application is in condition for allowance, and it is therefore respectfully requested that the rejections be reconsidered and withdrawn and a favorable action is hereby solicited.

Very truly yours,

CARELLA, BYRNE, BAIN, GILFILLAN,
CECCHI, STEWART & OLSTEIN

A handwritten signature in cursive script, appearing to read "Raymond J. Lillie", is written over the printed name.

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